Stormwater Management Requirements For Construction & Grading

County of San Diego *November 2002*

Stormwater Pollution

When rain flows over streets and other surfaces, it picks up pollutants and carries them into the stormwater conveyance ("storm drain") system. The storm drain system is designed to prevent flooding by transporting water away from urban areas. Unfortunately, this water and all the contaminants it contains eventually flow to our streams, lakes, and the ocean where we swim and fish. Once there, polluted runoff can harm wildlife and their habitats. In some cases, it can even cause beach closures or make our fish and shellfish unsafe to eat.

Your Responsibilities

The County of San Diego Watershed Protection Ordinance prohibits the discharge of pollutants to the storm drain system. Simply stated, only rain may legally enter the storm drain. As a construction site owner or operator, you are legally responsible for ensuring that sediment and other construction-related pollutants are properly managed. This means that pollutants from your site may not enter the storm drain system or any receiving water (such as creeks, streams, etc.) either directly or indirectly. You can also be held responsible for discharges or environmental damage caused by your employees or subcontractors.

Contents:

Construction Project Requirements

The County of San Diego has initiated a construction conditioning process to prevent discharges of pollutants from construction sites. Construction activities, such as mass grading, clearing and grubbing, remove vegetation and disrupt the structure of the soil surface. This disruption leaves the soil susceptible to erosion from rainfall, wind or excessive or improper water use. Sediment, from land disturbing activities, is a common component of stormwater. Sediment is a pollutant, and can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth and reproduction. Grading and clearing activities cause rain to runoff a project site at higher velocities than a site with natural vegetation.

(Continued on page 2)

Construction Project Requirements (continued)

The construction conditioning process requires that any person submitting a grading permit application must also document that appropriate Best Management Practices will be used to prevent stormwater pollution from their project site. Depending upon the size of the proposed project, either of two documents must be completed and submitted with the initial grading permit application.

1. **Certification of Compliance with the California General Permit for Construction Activities:** This form must be completed if construction activities will result in a soil disturbance or clearing of 5 acres or more.

2. **Stormwater Management Plan:** This form must be completed for all construction activities that disturb less than 5 acres of soil, but still pose a risk of stormwater pollution.

Your grading and construction activities will be reviewed by County staff during plan check and site inspections to verify compliance with the Watershed Protection Ordinance and related provisions of the County Grading Ordinance. Failure to comply with these regulations can result in civil and criminal penalties.

Best Management Practices (BMPs)

Construction site owners and developers are required to implement Best Management Practices (BMPs) to reduce pollutants to stormwater runoff. Best Management Practices are specific stormwater management techniques that are applied to manage construction site runoff. On the following pages, a number of BMPs that apply to erosion control and other construction activities are described. It is your responsibility to determine which of these (or other BMPs) are most appropriate for your project, and to implement them accordingly. Whether you are constructing a single family dwelling or a multiple unit housing development, the success of your efforts will ultimately depend on whether or not you have prevented pollutants from leaving the site.

Remember, knowledge is the most important tool on your site. Training your employees and subcontractors is the best way to ensure that your BMPs are implemented and maintained effectively.

An effective stormwater management plan is one which all potential pollutants are recognized and a plan to control/prevent them is designed. The plan must include a combination of BMPs to target each potential pollutant. This should include the following general steps.

Step 1. Planning and scheduling
Step 2. Erosion control
Step 3. Flow Control
Step 4. Sediment Control
Step 5. Site management
Step 6. Materials and waste management

STEP 1. PLANNING AND SCHEDULING

Planning and scheduling should always be a part of your stormwater management plan strategy. Effective planning can greatly reduce the need for other costly and time-consuming solutions. It can also save you considerable time and money. Whenever possible, plan your project to utilize existing topography, drainage patterns, and vegetation. This will significantly reduce the potential for erosion both during and after construction.

Grading and clearing should be phased to reduce the amount and the duration of sediment exposure. If possible schedule grading during the dry season (Mid-April through October), particularly avoiding December through February. Always be aware of forecasted weather conditions prior to any scheduled grading or clearing activities.

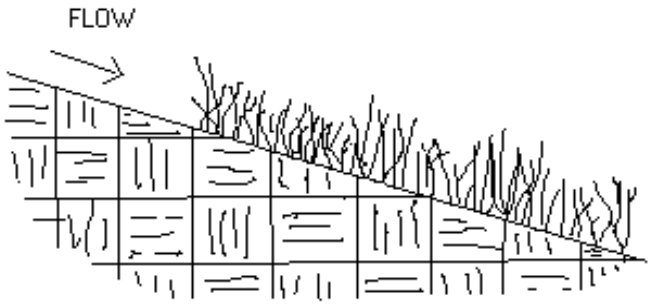
For weather forecasts, contact the National Weather Service at (619) 289-1212 or visit their web page http://www.wrh.noaa.gov/sandiego/index2.html

STEP 2. EROSION CONTROL

The County Grading Ordinance requires that slopes be stabilized as soon as they are created to increase their resistance to erosion. When permanent stabilization of slopes or other exposed surfaces is not yet feasible, temporary measures should always be used. A number of practical BMPs are below.

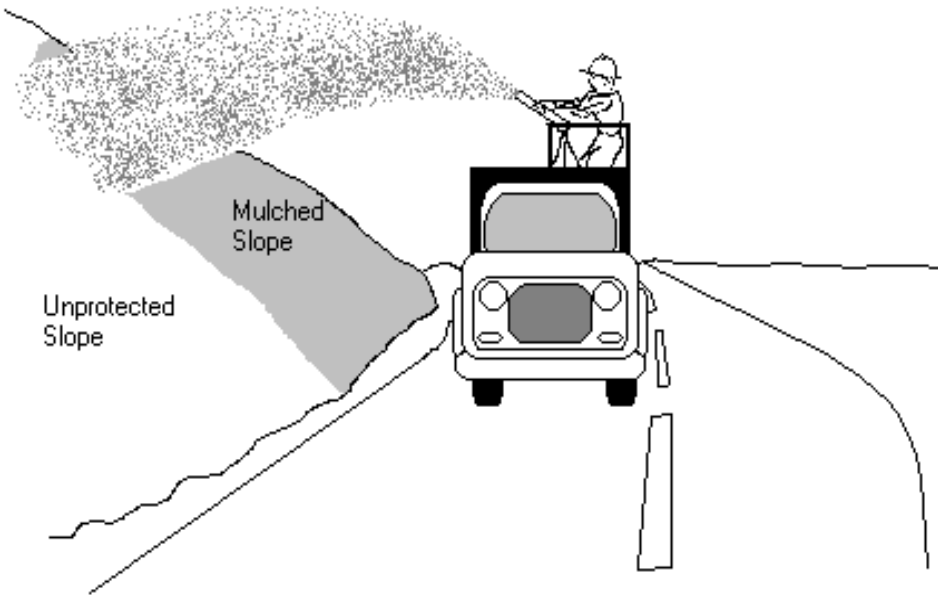
Preservation of Existing Vegetation. Leaving existing vegetation (trees, vines, shrubs, grasses, etc.) in place can minimize the potential for erosion. On a construction site, where extensive land disturbance is necessary, a reasonable BMP would be to not disturb land in sensitive areas that need not be altered for the project to be viable. Designing the site to incorporate particularly unique or desirable existing vegetation into the site-landscaping plan, will not only prevent erosion, it will be aesthetically pleasing.

Seeding and Planting. Seeding of grasses, sodding, planting trees, shrubs, vines and ground cover can provide long-term stabilization of slopes and soils. Permanent seeding and planting contributes to long-term site aesthetics and helps reduce erosion by reducing the velocity of runoff, allowing infiltration, filtering sediments, and by holding soil particles in place.

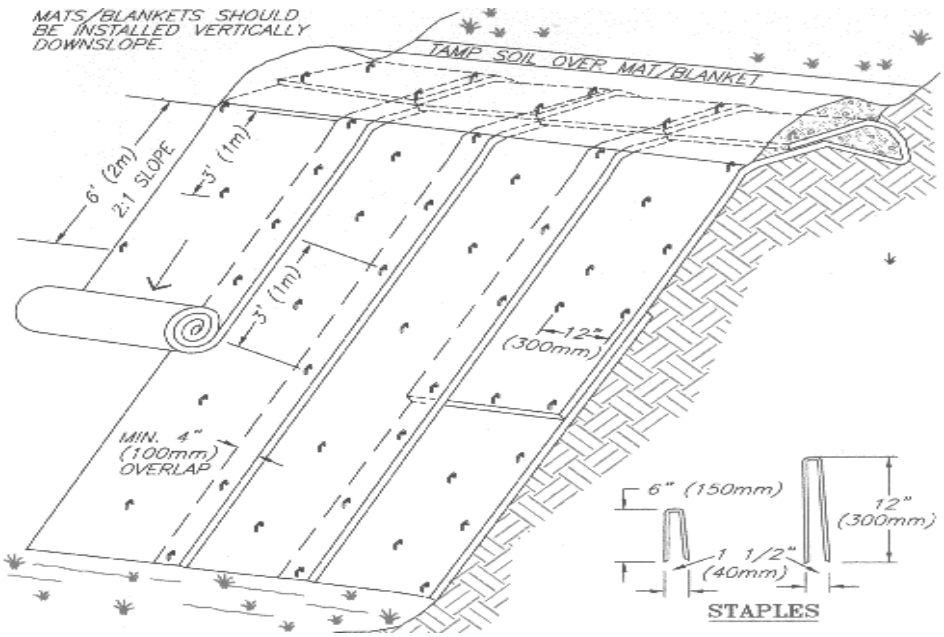


STEP 2. EROSION CONTROL (continued)

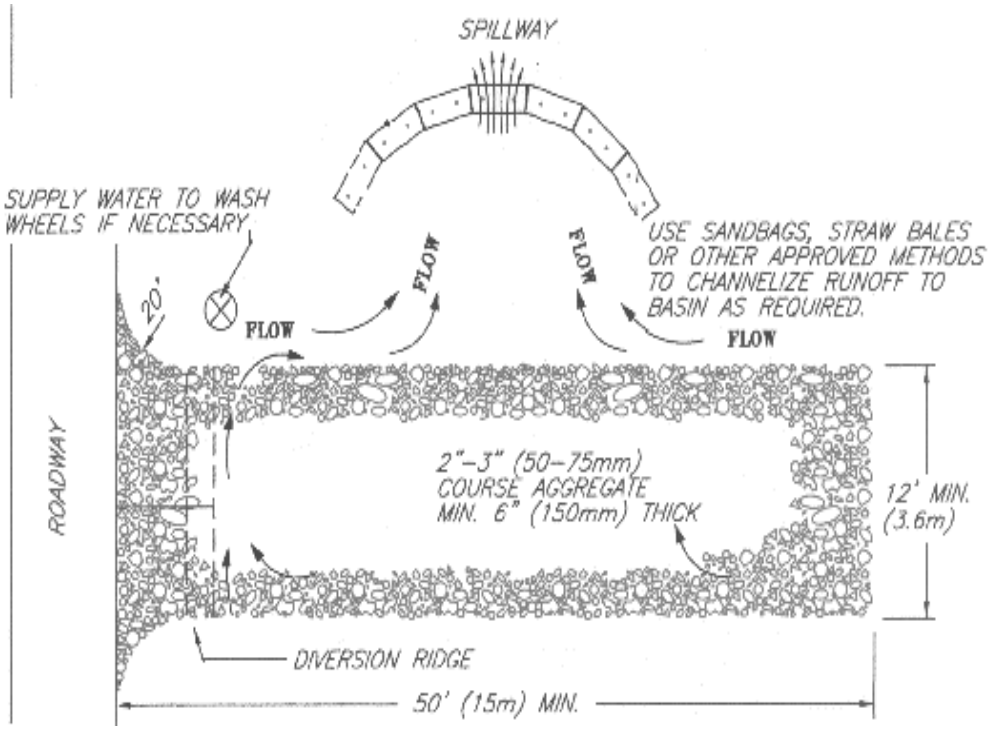
Mulches. Mulches (such as wood chips, bark, straw, hydroseeding, gravel etc.) protect the soil from rainfall impact, increases infiltration, conserves moisture around trees, shrubs and seeds, prevents compaction and cracking of soil, and aids plant growth for seedlings and plantings by holding the seeds, fertilizers and topsoil in place until growth occurs.



Geotextiles and Mats. Geotextiles and mats can be used for temporary or permanent soil stabilization, and are especially effective on steep slopes and channels. Geotextiles and mats are used to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. They should be inspected monthly and after significant rainfall.



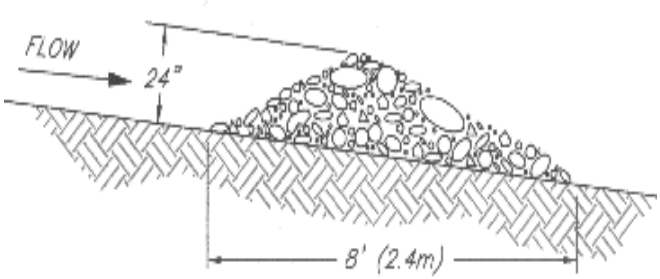
Stabilization of Vehicle Traffic Areas. All areas of significant vehicle traffic (site entrances, access roads, parking lots, etc.) should be stabilized immediately after grading to prevent erosion and control dust. Site entrances and exits are especially important. Use gravel approaches to limit tracking of sediment offsite



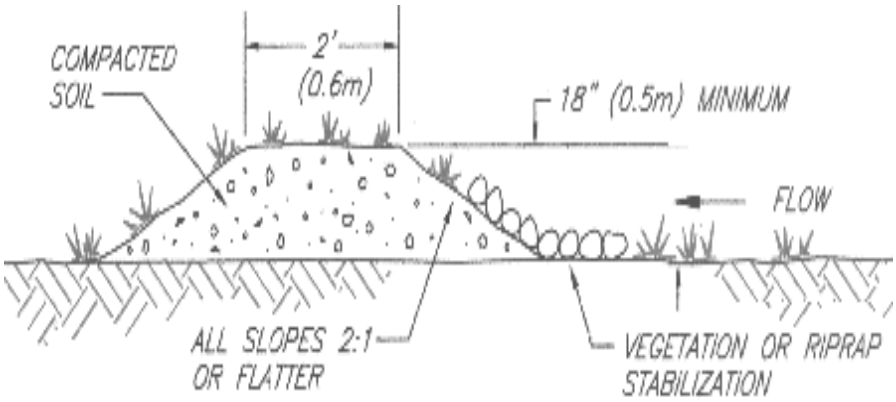
STEP 3. FLOW CONTROL

Effectively preventing sediment erosion generally requires a combination of surface stabilization and onsite flow control. Flow control methods reduce the ability of rainwater to erode sediments either by decreasing its velocity or by channeling it away from exposed surfaces. Below are a number of practices that are commonly used.

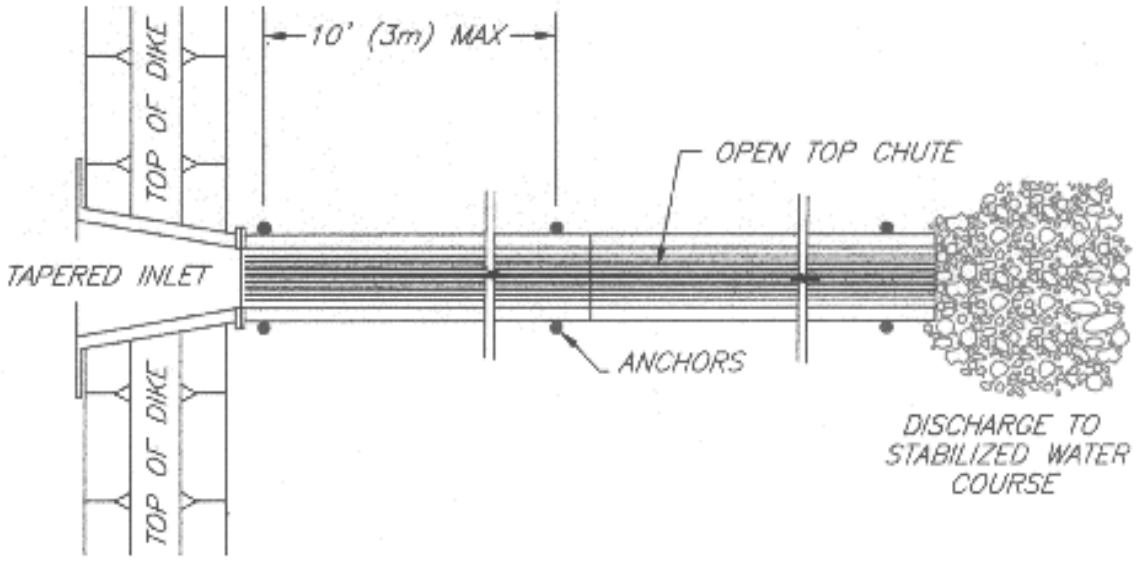
Earthen Dikes. Earthen dikes are berms or ridges of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or stabilized outlet, thereby reducing the potential for erosion and off site sedimentation. Earthen dikes can also be used to divert runoff from off-site and from undisturbed areas away from disturbed areas, and to divert sheet flows away from unprotected slopes. They are relatively inexpensive and can be constructed during initial grading operations.



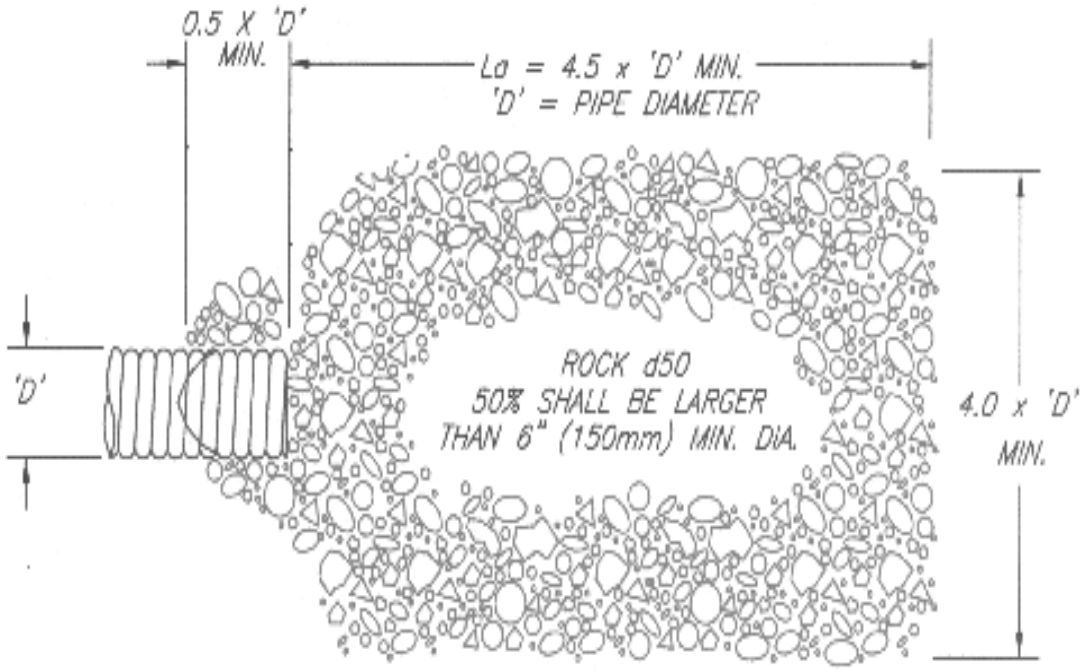
Temporary Drains and Swales. Temporary drains and swales can be used to divert off-site runoff around the construction site, divert runoff from stabilized areas around disturbed areas, and direct runoff into sediment basins or traps. These kinds of diversion structures should be installed when the site is initially graded, and remain in place until post-construction BMPs are installed and or the slopes stabilized.



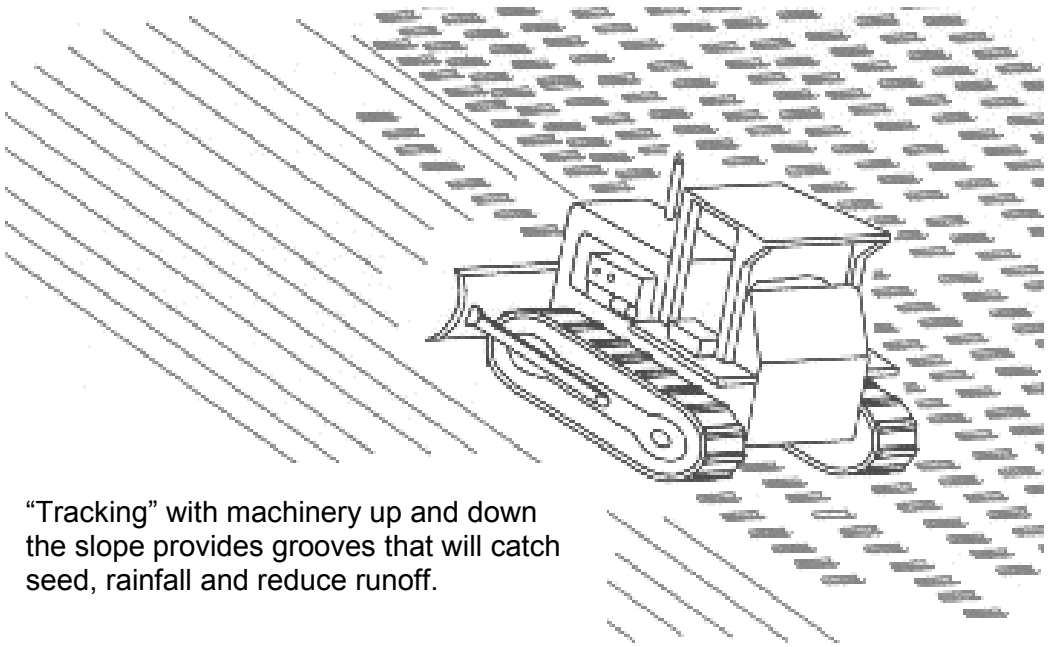
Slope Drains. A slope drain is a temporary pipe or lined channel to drain the top of a slope to a stable discharge point at the bottom. The slope drain may be a rigid pipe, such as corrugated metal, a flexible conduit or a lined terrace drain with the inlet placed on the top of a slope. The drain conveys concentrated runoff down to the bottom of the slope. The slope drain is applicable for any construction site where concentrated surface runoff can accumulate and must be conveyed down the slope in order to prevent erosion.



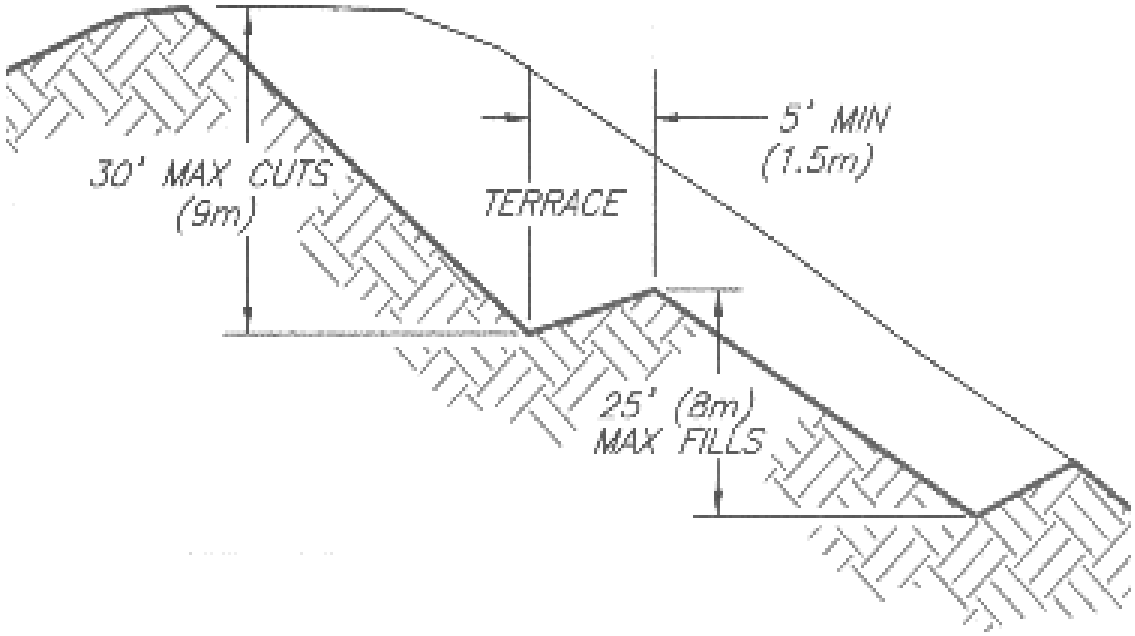
Outlet Protection. Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble which is placed at the outlet of a pipe to prevent scour of the soil caused by high pipe flow velocities, and to absorb flow energy to produce non-erosive velocities. Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach.



Slope Roughening and Terracing. Slope roughening and terracing creates uneven depressions, steps or grooves on the soil surface to aid in establishment of vegetation, reduce runoff velocity, and increase infiltration and sediment trapping.



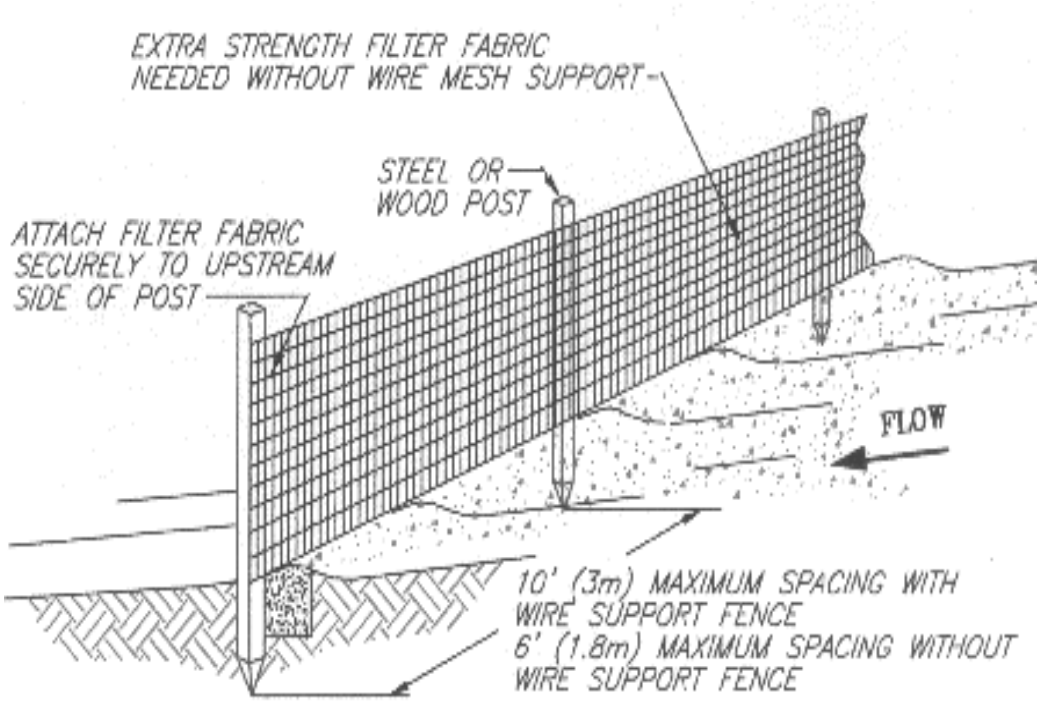
"Tracking" with machinery up and down the slope provides grooves that will catch seed, rainfall and reduce runoff.



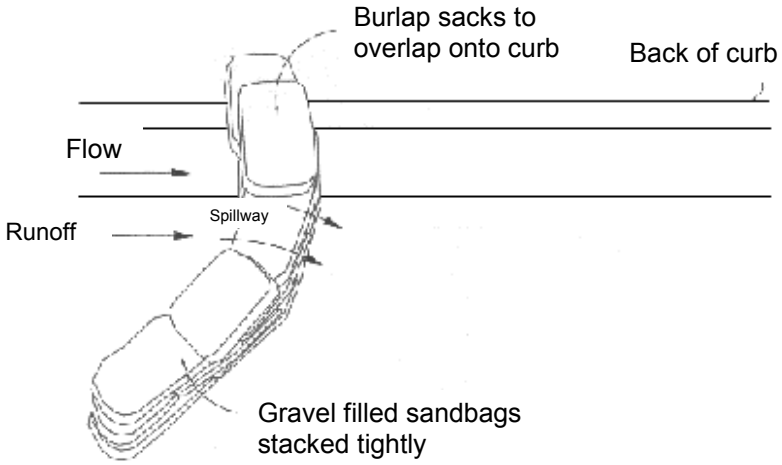
STEP 4. SEDIMENT CONTROL

Because soil erosion can never be completely prevented, methods of trapping eroded sediments so as to prevent a net increase in sediment load in stormwater discharges from the site are required. The following methods are commonly used to promote sedimentation by filtering or trapping runoff.

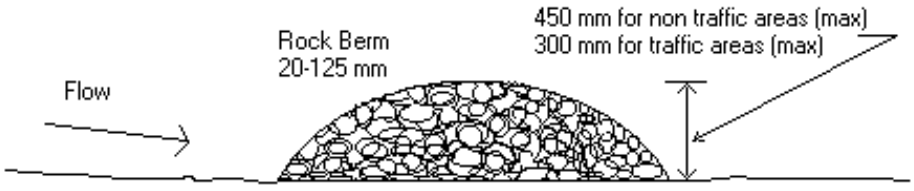
Silt Fences. A Silt fence is a temporary sediment barrier consisting of filter fabric stretched across and attached to supporting posts, entrenched, and, depending upon the strength of the fabricated, supported with wire fence. Silt fences may be used for perimeter control, placed upstream of the point(s) of discharge of sheet flow from a site. They may also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion, and perpendicular to minor swales or ditch lines that drain up to one acre. Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows.



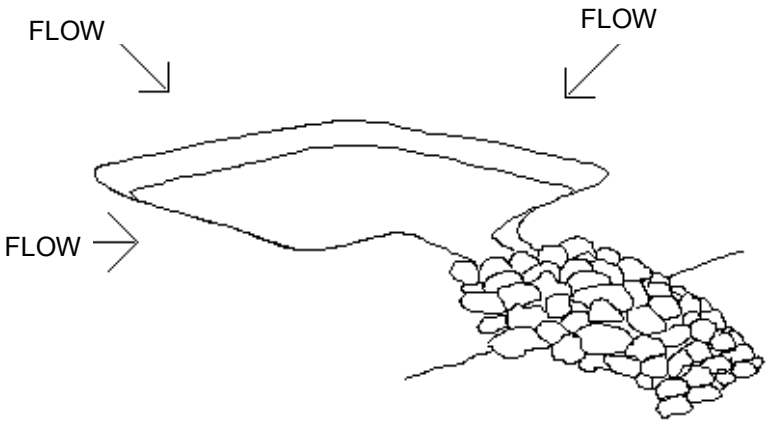
Sandbag Barrier. Stacking sandbags along a level contour creates a barrier which detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation. Sandbags may be used during construction activities in streambeds, temporary channel crossing for construction equipment and installed parallel to roadway construction. Sandbag berms may also be used to create temporary sediment traps, retention basins, and in locations where silt fences are not strong enough.



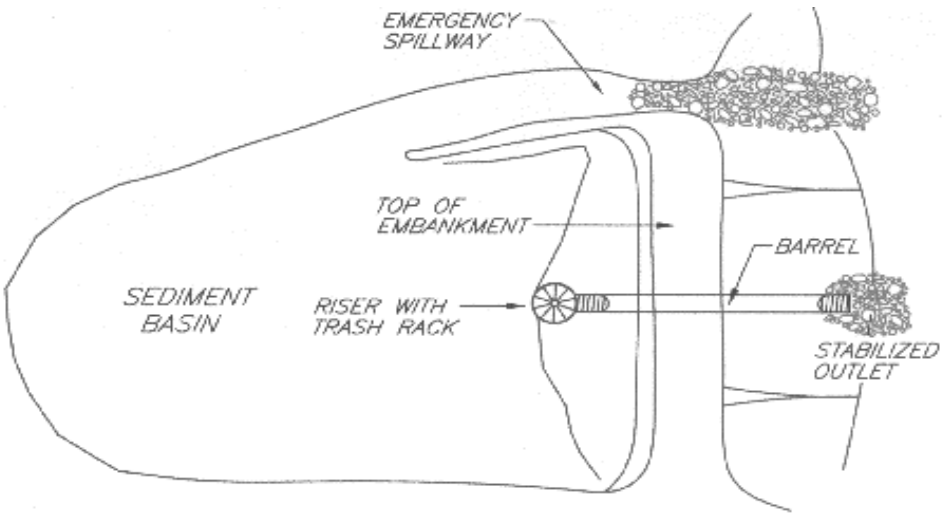
Brush and Rock Filters. Barriers constructed of brush or rock (3/4" to 3" diameter) can be used in areas of sheet or rill (channelized surfaces) flow to reduce velocity and trap sediment. Rock filters consist of open graded rock installed at the toe of a slope, along the perimeter of a developing or disturbed area, and as a check dam across construction roads. Their purpose is to intercept sediment-laden runoff from disturbed areas of the site, allow the runoff to pond, promote sedimentation behind the filter, and slowly release the water as sheet flow. Rock filters are appropriate where a temporary measure is needed to prevent sediments from entering right-of-ways of traffic areas such as near the toe of slopes, incorporated into temporary stabilized construction entrances, or at other locations along the construction site perimeter.



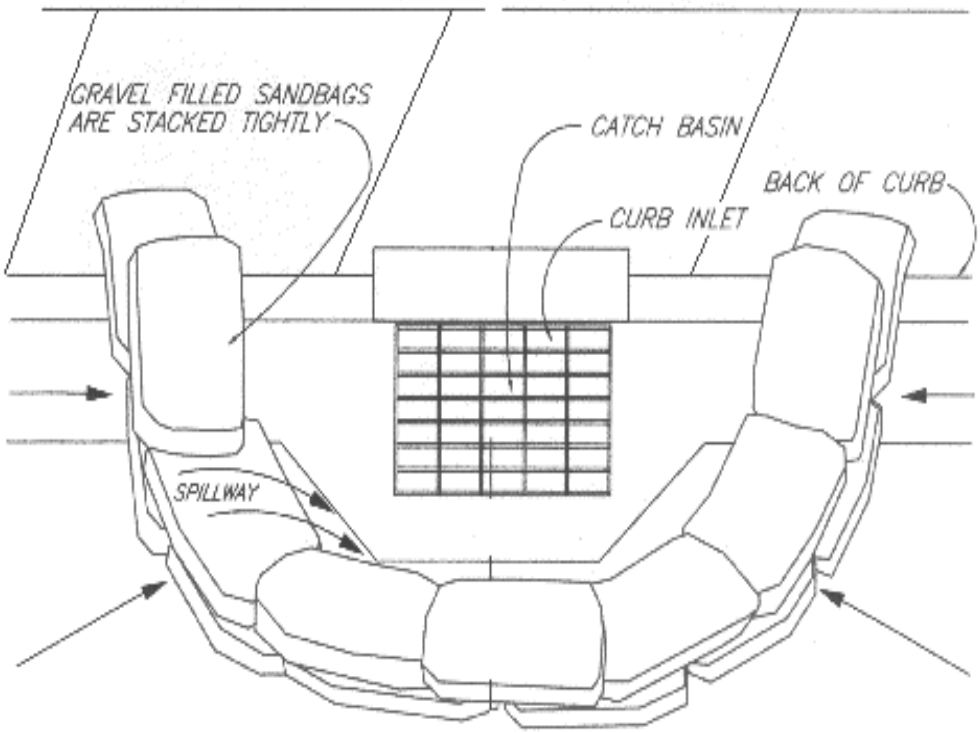
Sediment Traps. A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation and/or by constructing an earthen embankment. Its purpose is to collect and store sediment from sites cleared and/or graded during construction. It is intended for use on small drainage areas (less than 5 acres), with no unusual drainage features, and projected for a quick build-out time. The sediment trap is a temporary measure with a design life of approximately 6 months, and is to be maintained until the site is permanently protected against erosion by vegetation and/or other structures.



Sediment Basin. A sediment basin is a controlled stormwater release structure formed by excavation or by constructing an embankment of compacted soil across a drainage way, or other suitable location. Its purpose is to collect and store sediment from sites cleared and/or graded during construction for extended periods of time before reestablishment of permanent vegetation and/or construction of permanent drainage structures. It is intended to trap sediment before it leaves the construction site. The basin is a temporary measure (design life of 12 to 18 months) and is to be maintained until the site area is permanently protected against erosion or a permanent detention basin is constructed. Whenever possible, construct sediment basins prior to clearing or grading the site. They should be located at the stormwater outlet for the site, but not in any natural or undisturbed stream.



Storm Drain Inlet Protection. Devices of various designs, which detain sediment-laden runoff and allow the sediment to settle prior to discharge into a storm drain inlet or curb inlet. This sediment control BMP prevents excessive sediment from entering storm drain systems prior to permanent stabilization of the disturbed area. All on-site storm drain inlets should be protected for the life of the project. Off- site, inlets should be protected where construction activity tracks sediment onto paved areas or where inlets receive runoff from disturbed areas.

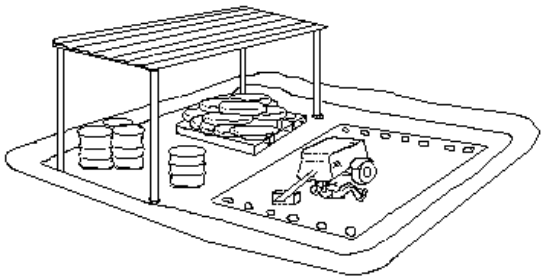


STEP 5. SITE MANAGEMENT

Below are some general construction activities that have the potential to discharge pollutants into stormwater. Structural and non-structural BMPs should be implemented to address specific site conditions and construction support activities.

De-watering Operations. Prevent or reduce the discharge of pollutants to stormwater from de-watering operations by using sediment controls and by testing the groundwater for pollution prior to discharging into the storm drain system. There are two general classes of pollutants that may result from de-watering operations; sediment, and toxics/petroleum products. A high sediment content in de-watering discharges is common because of the nature of the operation. Toxics and petroleum products are not commonly found in de-watering discharges unless, the site or surrounding area has been used for light or heavy industrial activities, or the area has a history of groundwater contamination.

Vehicle and Equipment Maintenance. You can prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance by running a "dry site". This involves using off-site facilities, performing work in designated areas only, providing cover for materials stored outside, checking for leaks and spills, containing and cleaning up spills immediately, and training employees and subcontractors.



Vehicle and Equipment Fueling. You can prevent fuel spills and leaks, and reduce their impacts to stormwater by using off-sited facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors.

Vehicle and Equipment Cleaning. You can prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltration or recycling the wash water, and training employees and subcontractors.

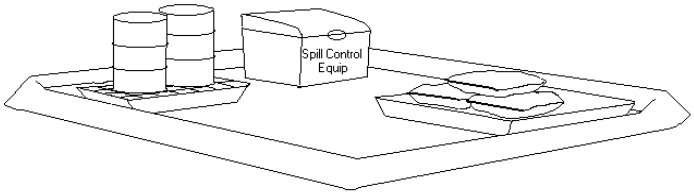
Employee and Subcontractor Training. Employee and subcontractor training, is not so much a Best Management Practice as it is a method by which to implement BMPs. The importance of training and of integrating the elements of employee and subcontractor training from the individual source controls into a comprehensive training program as a part of a company's Stormwater Management Plan is very important.

STEP 6. MATERIAL AND WASTE MANAGEMENT

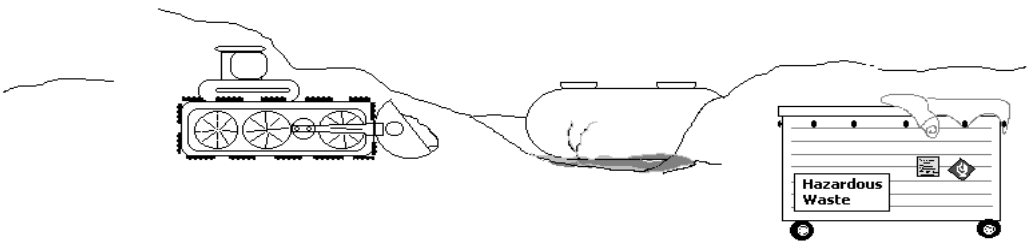
Below are some methods to manage construction materials and wastes to prevent their disposition into storm-water, drainage systems, and receiving waters.

Material Delivery and Storage. Prevent or reduce the discharge of pollutants to stormwater from material delivery and storage by minimizing the storage of materials on site, storing materials in a designated area, installing secondary containment, covering materials, conducting regular inspections and training employees and subcontractors.

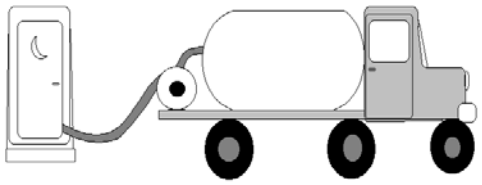
Spill Prevention and Control. Prevent or reduce the discharge of pollutants to stormwater from leaks and spills by reducing the potential for spills, stopping the source of spills, containing and cleaning up spills promptly, properly disposing of spill materials, and training employees.



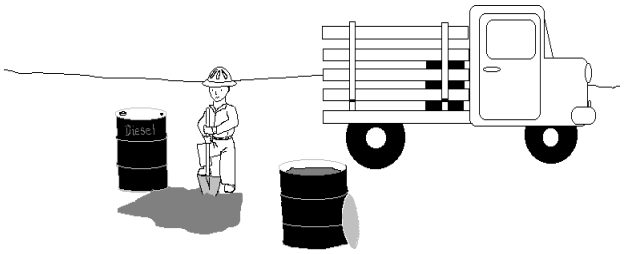
Hazardous Waste Management. Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, covering wastes and training employees and subcontractor.



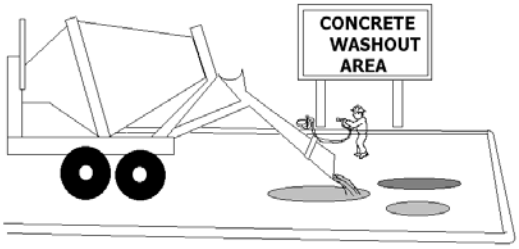
Sanitary and Septic Waste Management. Prevent or reduce the discharge of pollutants to stormwater from sanitary/septic waste by providing convenient, well-maintained facilities, and arranging for regular service disposal. Sanitary or septic wastes should be treated or disposed of in accordance with State and local requirements.



Contaminated Soil Management. Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.



Concrete Waste Management. The discharge of pollutants to stormwater from concrete waste can be prevented. Some ways to reduce concrete wastes in stormwater are; store dry and wet materials under cover, avoid mixing excess amounts of fresh concrete on-site, do not wash out concrete trucks into storm drains, open ditches, streets, or streams. You should perform the washout of concrete trucks off-site or in designated areas. Do not allow excess concrete to be dumped on-site, except in designated areas. On-site washout areas should be located at least 50feet from storm drains, open ditches, or water bodies.



Example of a Stormwater Management Plan for a Single Family Residence Lot

Even though a project may be limited in scope, the potential for discharges of pollutants to a Stormwater conveyance system or receiving water is still present. The Stormwater Management Plan is a comprehensive plan designed to address the short-term and long-term mitigation of environmental impacts on a disturbed site. These mitigation measures are designed to address the impacts of project construction and operation.

In planning the comprehensive erosion and sediment control system, the project proponent should perform the following to determine the types of BMPs that should be implemented to prevent non-stormwater discharges:

- Identify potential environmental impact
- Develop design objectives
- Nominate and evaluate alternatives
- Select the most appropriate BMPs
- Present a comprehensive erosion and sediment control plan

Figure A, shows an example of a single family lot and types of structural BMPs that may be installed to prevent erosion and control sediment. All BMPs below can be found listed on Tables A and B of the Stormwater Management Plan with descriptions found in the Caltrans "Construction Contractor's Guide and Specifications" and the "California Storm Water Best Management Practices Handbooks". Copies of these resources can be found at both the Department of Public Works (DPW) and Department of Planning and Land Use (DPLU) Permit counters.

Structural BMPs

Erosion Control: Temporary Mulching, Geotextiles, Mats, and Fiber Rolls, Soil stabilizers and Temporary Seeding and Planting.

Sediment Control: Silt fence, Straw Wattles, Storm Drain Inlet Protection, and Stabilized Construction Entrance.

General Site Management: Material Delivery and Storage, Spill Prevention and Control, Solid Waste Management, Sanitary/Septic Waste Management

Non-Structural BMPs

Scheduling, Preservation of Existing Vegetation, Employee and Subcontractor Training

See Figure A on facing page.

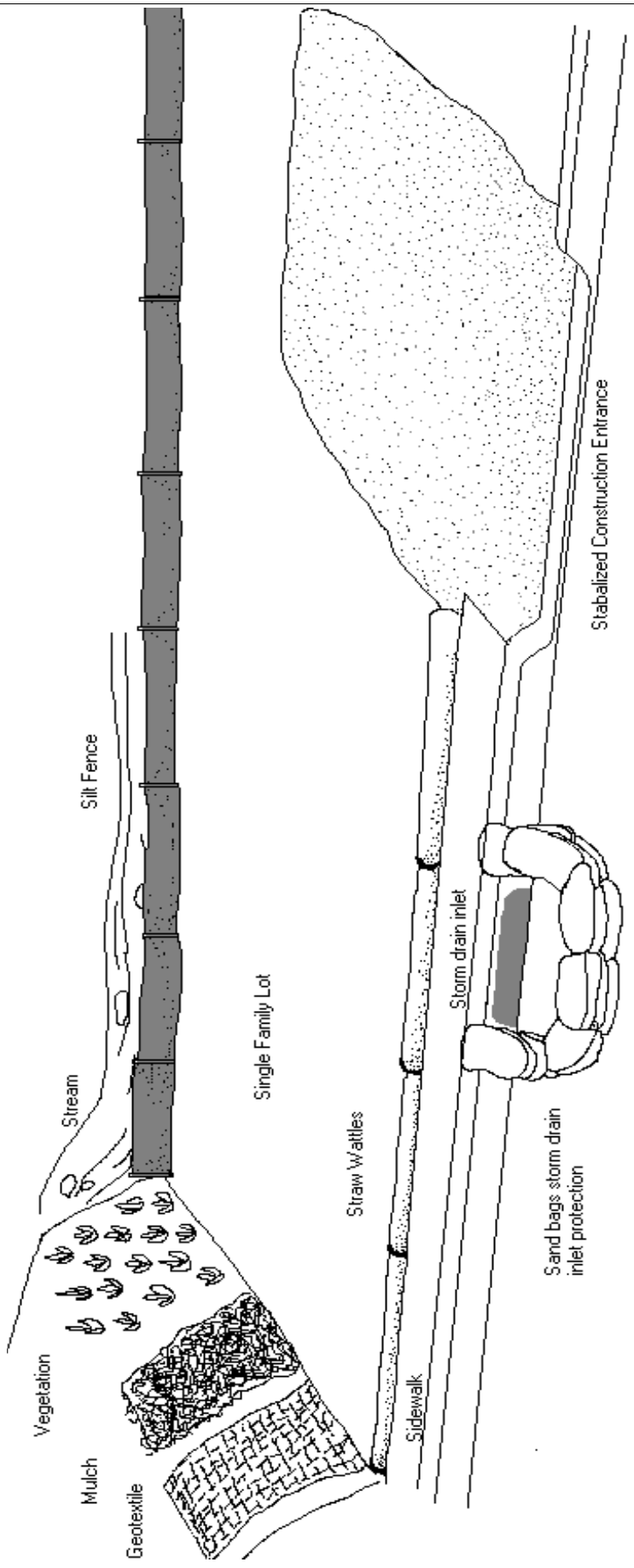

Stabalized Construction Entrance
Silt Fence
Stream
Single Family Lot
Storm drain inlet
Straw Wattles
Sand bags storm drain inlet protection
Sidewalk
Vegetation
Mulch
Geotextile

FIGURE A

Notes :

Notes :

project clean water

"clean water through local commitment and action"

What can you do to help?

- Reduce, Reuse, and Recycle
- Use safe substitutes for pesticides, fertilizers and household chemicals
- Properly dispose of household chemicals, used motor oil, and recyclables by calling 1-877-R-1-EARTH
- Plant or mulch slopes for erosion control
- Conserve water
- Pick up after your pet

www.projectcleanwater.org

For more information call (888) 846-0800

County of San Diego

November 2002

Department of Environmental Health
Water Quality Program
1255 Imperial Ave.
PO Box 129261
San Diego CA 92112-9261

Stormwater Hotline: 888-846-0800
Phone: 619-338-2222
Fax: 619-338-2174

"Only rain may legally enter the storm drain system!"

WE'RE ON THE WEB!
http://www.co.san-diego.ca.us/

Important resources:

San Diego Regional Water Quality Control Board

(858) 467-2952 www.swrcb.ca.gov/~rwqcb9

California State Water Resources Control Board

(916) 657-1146 www.swrcb.ca.gov

U.S. Environmental Protection Agency (Region 9)

(415) 744-1906 www.epa.gov/region09/water

Technical Information:

California Construction Stormwater Handbook

(510) 287-5485

Caltrans Stormwater Quality Handbooks

(916) 445-3520

Common Questions and Answers

Q: Why should I be concerned with stormwater?
A: Stormwater should be a major concern for all San Diego residents because polluted stormwater degrades the water quality of our streams, lakes and ocean.

Q: Is sediment really a pollutant?
A: Yes, other pollutants adhere to sediment particles and are deposited into our receiving waters. Sediment deposited in streams interferes with the lifecycles of many aquatic organisms.

Q: I am grading my lot for a single family home and I only need a minor grading permit. Do I still need to submit the BMP documentation form?
A: Yes, any grading project, regardless of size, has the potential to pollute stormwater if not properly protected.

Q: I am developing a site that is greater than 5 acres. Do I need to submit my Storm water Pollution Prevention Plan (SWPPP) to the County for approval?
A: No, the County only requires that a person fill out the form for projects of 5 acres or greater, certifying that a SWPPP has been prepared. The SWPPP must be kept on site and available for review by County staff.

Q: I bought some sand bags, hay bales and silt fence for erosion control. Do I need more than that?
A: Yes, silt fences, sand bags and hay bales are "sediment control" devices and do not provide for "erosion control". Erosion control devices prevent soil from being eroded by rain, wind or excessive watering.